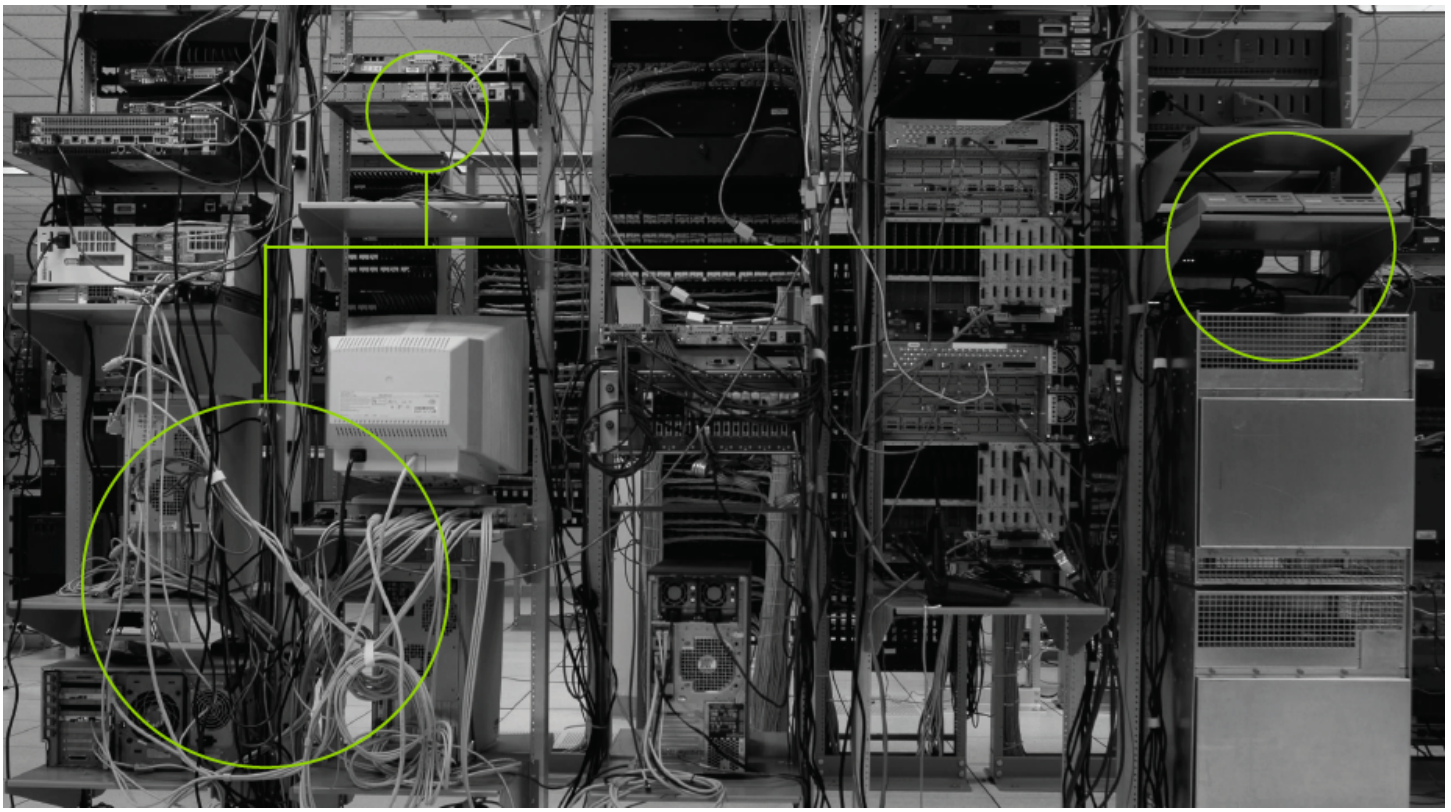
NETSCOUT

EGUIDE



LIFEHACKS FOR NETWORK TECHS

HOW TO FINISH FIRST AND GET AHEAD

Humans can survive up to three weeks without food; we figure no more than 24 hours without network access. Secure your network with our lifehack guide!

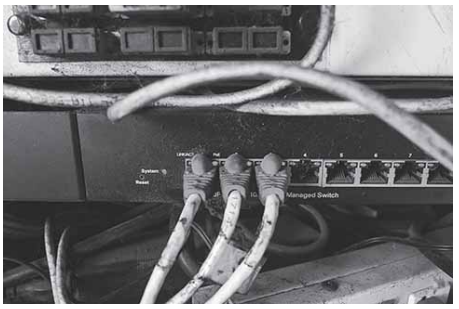
Does work feel like playing a game of cat and mouse? Are you running to the next problem before you've even solved the last? If the answer is yes to either of these, you might be a network tech – and you might appreciate a bit of help.

Network techs are the valiant first-line of defense against network issues. Armed with a handy set of know-how, you'll spend your time dodging and diving, troubleshooting and tool-juggling to stave off network meltdown.

Your dreams may be fraught with flashing red lights, echoing the one, hundreds, or thousands of issues that await in the near future. But don't fret; you're not alone.

There your comrades in arms, the network engineer back at HQ pilfering through data and reports, and there's us – the diligent community at large willing to proffer our immense wisdom and knowledge. We're here to guide you in the quick-and-easy, with a selection of neat tricks to bolster your troubleshooting capability and help you survive the frontlines of network troubleshooting.

Go forth with this lifehack guide at your side, and no longer be tormented by frustrated users, dreaded red lights, labored connection speeds, and finicky cables. Use it to check back – comparing whether your problem-solving methods match up to the advice provided here. And remember, it's not just about lugging tools around, but having the right tools for the job at hand.



CATEGORY #1 – SLOW OR DISRUPTED CONNECTION

A slow connection is a worthless connection. It's a nuisance for all involved. You'll hear no end of belly aching about slow loading webpages, or file transfer bars that refuse to budge.

Slow connection speeds can cause havoc across a network, and their resolution represents one of the main duties bestowed upon network technicians.

1. PATCH CABLES AND LINK SPEED VERIFICATION

Patch cables and unverified link speeds are common culprits of slow connection speeds. Patch cables can be problematic firstly due to their susceptibly to failure and secondly because not all manufacturers conduct 100%-performance tests on their patch cables.

Additionally, problematic patch cables are the unfortunate flip-side to inheriting the cabling of a past occupier. The last network tech won't have held up to your standards. Then there is link speed to consider. You installed 1 or 10 Gig links, but did you ever verify from each wall jack that users are actually getting the expected speed? With all of that consider, here are a few easy things to try out:

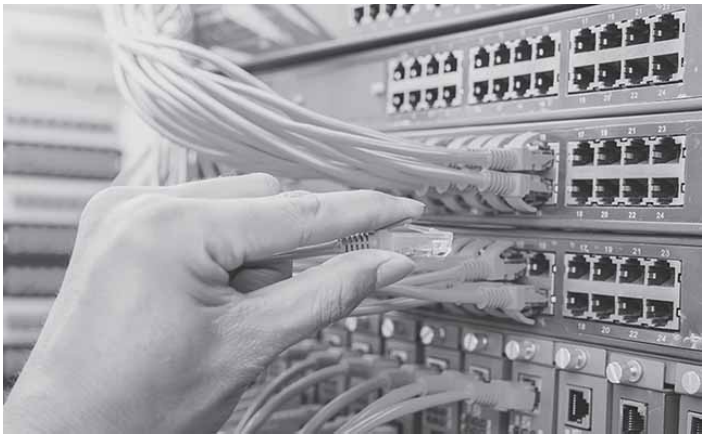
1. **Check for physical damage and degradation** – Before you turn on the network auto-tester, make sure all corresponding patch cables are intact (basically, that their plastic casing hasn't been accidentally sliced or gnawed on by rodents). Cabling can degrade overtime, and exposed cabling will soon lead to a degraded or disconnected network.
2. **Replace cables** – If you suspect you're dealing with low-grade cables, replacing them with those from manufacturers that conduct 100%-performance testing will prove a small investment with huge gains.
3. **Age matters** – If you're dealing with older cabling, it may be that you've ended up with the Cat 5 standard, or even the dreaded Cat 3 (which is limited to 10 Mbps. Eww). While Cat 5 and Cat E can technically sort-of support a Gigabit connection, neither will perform to an ideal standard. You'll want Cat 6 for reliable, fast Gigabit connections.
4. **Validate time** – Now that you've guaranteed you're dealing with A-OK cabling, it's time to whip out the network auto-tester. This will take out much of the remaining guesswork, testing the connection integrity at different speeds to ensure the cable is able to push a Gigabit connection.

2. ROUTERS, SWITCHES, AND WIRELESS ACCESS POINTS (WAP)

Network connections are susceptible to a host of potential connection faults. **Like cables, routers, switches, and WAPs can degrade overtime, or use older (read: slower) technologies that don't hold up to today's standards.** Additionally, routers, switches, and WAPs are both the culprits and victims of daisy changing, wherein additional components can compromise the performance or stability of existing components by the adding of too many 'loops'. So, here's what you do to start troubleshooting:

1. **Reset spree** – Resetting is an age-old tech tradition, but you might not know exactly why. Resetting can, in fact, be an extremely effective solution to solving many basic problems. For example, resetting a wireless router can help overcome frequency clashes with nearby routers, which are commonly responsible for reduced signal strengths and connection speeds.
2. **Isolate the guilty parties** – Start by testing other machines in the vicinity to check whether the network issues persist. If not, then it's time to look at the cables and hardware connected to the affected machine. Similarly, a comparison between LAN and WLAN connections will enable you to determine which piece of hardware is causing the problem – whether the switch, router, or WAP. Troubleshooting faults, however, will always require a process of elimination. For example, while a faulty switch can mean that all connected machines will be similarly affected, it could also be the case that only one Ethernet port is faulty.
3. **Check the age** – Hardware doesn't stay new and shiny forever. If you're working at a site with a fiber-optic connection, you'll need the latest WAP, routers, and cables to deliver optimal transfer speeds. As we increase our dependency on untethered connections, it's vital that we keep our wireless components up-to-date. For example, checking the router for its 'standard' will help to determine where it stands on the evolutionary timeline (for reference, it goes "b", "g", and "n" from oldest to newest). A router with a standard of 802.11b will be severely limited in both speed and range. In fact, these routers are so old that they're hard to find, so the nearby antique store will appreciate the gift.
4. **Troubleshoot and test** – Once all other options have been exhausted, it's time to unsheathe the testing tools. The difficulty in diagnosing network errors from a visual inspection is that faults aren't always clear-cut. You won't always be able to see a PoE connection that has degraded, for example, unless your VoIP device simply doesn't work. **A large portion of network troubleshooting is about addressing problems at their midway point between passable operation and complete failure (i.e. there are no lights, not even haunting red ones).** Spotting for obvious hardware deficiencies is a smart first step, but won't solve every problem.

When all else fails, network and wireless testers will save the day. Wireless testers can provide an instant view of test results to help pinpoint the affected area in real-time, including the ability to detect interference, while network testers are a great way to validate network connectivity to test, among other things, the physical layer, PoE, switch connections, and gateway/router connections.



3. INTERNET CONNECTIONS AND ISP

Internet connection issues may not always be the first sign of trouble, but they're certainly the most crowd rousing. We cannot abide by a sluggish network. However, while slow connections feature as one of the most commonly reported issues, they're unfortunately subject to much vagueness, making your job a tad more problematic. Nevertheless, issues are easily solved with some sound troubleshooting strategies and a few rounds of elimination.

1. **Clarify the issue** – Part of the problem with troubleshooting Internet speed issues is that it's not always the network's, nor even the ISP's, fault. Yes, many times the DHCP server will be playing up, or the ISP just isn't keeping up their end of the bargain, but slow speeds can also be a down to a host of minute external factors. For the average office-based user, poor connections will be the assumed cause of a slow loading webpage or email client. First thing's first, then, clarify that the reported issue has an internal origin (i.e., there's something you can actually do about it). Check various websites to monitor the average speed, and repeat the process with an alternate computer.

2. **Comparing the purchased speed and actual speed** – First, you'll want to ascertain what their definition of 'slow' means. One man's slowness is another's lightning fast, etc. You'll probably already have the information regarding the site's supplier and connection, leaving only the task of monitoring the connection received. Simple web-based software, such as speedtest.net, can be used to test download and upload speeds, as well as the average ping on any single machine. This will better position you to diagnose the problem. If, for example, the site is on a 100Mbps fiber-optic connection but the machine is only receiving about 10% of that, it's likely that there's an issue with the patch cable connected to the switch or router. Consider the quality and speed or Cat standard (i.e. Cat 3, Cat 4, Cat 5, etc.) of the patch cable used. Either way, you'll have your network testing tool on-hand to check each component.

3. **Dealing with connection drop** – A computer or network receiving no connection is a little more troubling, but nevertheless solvable. If the issue is that there's no connection to a specific webpage, first try another webpage, and, failing that, try another DNS server (which is the server used to look for the domain information). If, however, it's clear that there's simply no connection to be had, checking all the utilized hardware as per the advice provided in the router and switch section is a good place to start. Failing that, there might be issues with the DHCP server if you're dealing with a network that has a DHCP environment (the client and/or protocol used to provide an IP address to joining systems), which can be checked using a network tester.

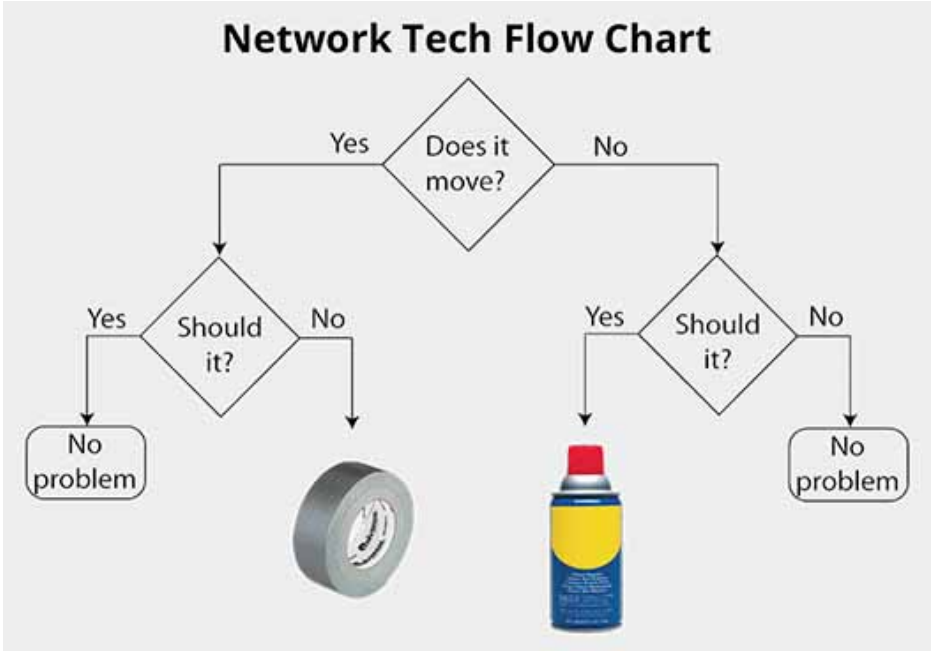
4. **Turn to the ISP** – Once you've ruled out every possible internal factor, it's time to grab your pitchfork and head over to the ISP. Slow Internet connections are, as we've said, sometimes out of your control. ISPs can have off days too, albeit rarely. Giving them a call will help you understand any external issues, which can be reported back to management and documented as a one-off incident.

BONUS LIFE HACK – MULTIPLE USES FOR DUCT TAPE

We may live in a world of high-tech gadgets, but there's still no replacement for good ol' duct tape. It was once said that anyone can survive if they had some Lubricant spray and a roll of duct tape at their side; they're the old-fashioned maintenance tools, and a sure-fire way to restore order to anything desperately attempting to fall apart.

1. **Tie up network cables** – When you've run out of zip ties, duct tape is your next best-in-slot item. It's an aggressive adhesive, but it'll ensure those cables never separate (or move much at all).
2. **Make a splint** – Wrapping duct tape around a broken limb or a gaping wound probably won't cure it, but it can be used to create a temporary splint, stabilized with splint material and padding.
3. **Repair broken glass** – Whether you're talking monitor glass, windscreen glass, window glass, or just about any glass, duct tape is a great stop-gap measure to prevent further damage.
4. **Arts and crafts** – You'd be surprised with the number of things that can be made with the help of duct tape, including phone cases, wallets, iPad stands, and even paintings.
5. **Insulate your shoes** – Duct tape is a great way to insulate a pair of shoes (preferably boots that won't be ruined!) from mud, the cold, or rain water.
6. **Trailblaze** – Duct tape is a reliable way to mark a trail for others to follow. No need for tracking hijinks – simply follow the reassuring gray line through a dark and spooky forest.
7. **Stick PoE Ethernet cables to the walls** – When your patch cables need to reach out-of-the-way places, duct tape is your go- to solution. Especially for a cable traversing distance and scaling heights, such as those used for security cameras, you need a strong adhesive to keep cabling tucked and tidied away.
8. **Repair fabric** – Use duct tape to secure holes by applying a strip on the inside of the tear – great for clothes, blankets, or sleeping bags.
9. **Fix the roof** – Is that pesky roof and/or ceiling leaking again? A few strips of duct tape will secure any leakage in times of dire need.

"Internet connection issues may not always be the first sign of trouble, but they're certainly the most crowd rousing."



CATEGORY #2 – POWER OVER ETHERNET (POE) TROUBLESHOOTING

PoE connections are becoming increasingly ubiquitous within network environments. Power over Ethernet is an awesome technology that enables the connection of disparate network components (spread across multi-story buildings, for example) with far less cable wrangling, hole cutting, and general décor destruction. Especially within new sites, PoE ensures that network infrastructure isn't inhibited by the layout of the building or the amount or spread of existing wall sockets, and is especially valuable for connecting out-of-the-way components such as security cameras, badge scanners, or VoIP phones.

1. VERIFY THE SYMPTOM

To address reported PoE issues, the first thing to do is verify the symptom. You'll either be faced with a complete loss of power, or a reduction in power output that prevents the device from operating properly.

1. **Check power-up** – Investigate whether the reported device powers up at all; if a single light is shining, no matter how diminished, then complete technical failure can be ruled out.
2. **Check power consistency** – If the device does power-up, watch for fluctuations. This requires either observing the device or testing it out. If, for example, you're dealing with a security camera, access the camera's management software to pick up any system messages. Devices will usually have predefined required power thresholds that, when triggered, will display a notification message.
3. **Investigate when the trouble began** – Test whether the fault occurred immediately after setup (i.e. there was never enough power supply) or developed overtime.
4. **See what's changed** – Is the network over capacity? Are there too many PoE devices attached to a single access point or switch? Do the issues only occur during periods of heavy load? Does the same issue recur on other ports, or is it confined to the one? Go through and eliminate the variables to determine whether there is a pattern, or whether you're simply dealing with faulty hardware.

2. FOCUS ON THE PHYSICAL LAYER

PoE is a poorly understood technology in general. Despite its immense value, it's often taken for granted as a 'plug-n-play' component. But a PoE connection isn't like that of a standard power adapter. It plugs, but it doesn't always play. For each of its benefits, there are also many potential vulnerabilities to watch out for on the physical layer – issues that, if left unsolved, can be hugely detrimental to the network.

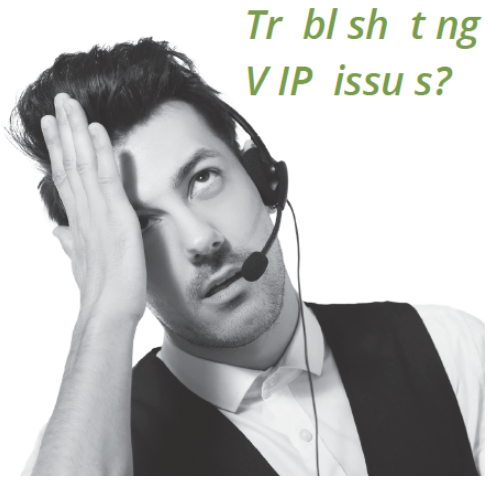
1. **Power degradation over distance** – If you're working on a newly furbished site, it's likely you've inherited a fair amount of cabling. Any initial sigh of relief can, however, be replaced by the realization that half the cabling is about as useful as the spider webs occupying the server room. It can be too old, too worn, or not have been laid in accordance with the TIA 568 standards of cable runs being no more than 100 meters. PoE distance limitation follows the same standard as TIA 568 with a 100-meter limitation. The reason for this is simple: power dissipates over distance. It's also important the PoE voltage measurements be made at the wall jack where the Powered Device (PD) sits and not the Power Sourcing Equipment (PSE); this is because the voltage levels of the switch ports and the wall jack will be different once the power has traversed the network cable.
2. **Too many PoE devices can lead to an unhappy network** – If you've got devices clinging for power, managing to boot up but soon after shutting down, it's likely that there's a high-power demand on the connected switch; the switch and its various ports may not be properly provisioned, depending on the amount of power required by the PD. This can be resolved by ensuring the switch has been correctly provisioned or by spreading distribution to additional PoE- capable hardware, whether through additional network switches, midspans (PoE without the switching capability), or power injectors. Make sure you understand the power requirement of each PD (don't assume they all use the same – they don't). It can be that the power output of the connected interface port simply isn't sufficient.

3. **Check both the switch and the PD** – If a PD isn't booting up, it could either be that the device has simply failed and needs replacement, or that the power connection is configured improperly. Check that the switch and specific port used is PoEcapable. Some switches are partial-PoE capable, meaning that only specific interfaces can function as PoE ports. Lastly, compare the power requirement of the device to the maximum output of the interface. This can either be detected through the switch's software or with the help of a network tester and again, you need to verify the voltage level at the wall jack where the PD will be installed, not at the switch port.

3. DEVELOPING PREVENTION STRATEGIES

PoE devices are being utilized at sites for a variety of purposes, but none is greater than that of security. Security devices, such as cameras and badge scanners, require the ability to continuously transmit and receive data to enforce security protocols. And as with anything security related, reliability is essential. A VoIP phone intermittently losing power might seem acceptable, but gaps in a security camera feed aren't likely to go unnoticed by management. **You'll always have a network tester on-hand to make a quick job of diagnosing a newly-sprouted issue or sudden power loss, but it's also useful to adopt some basic prevention strategies to avoid future headaches.**

1. **Install UPS on switches** – Let's say that it's the switch failing and not the device or the port interface – UPS is an industry-standard method to safeguarding networks against power loss, which includes switches, routers, and APs. It's a safe bet that your network will already be using them for server machines. They are, however, equally essential for safeguarding PoE switches. While installation of new or additional UPS units will likely be the decision of the network engineer, you can certainly make your reasoned case known.



2. **Familiarize yourself with power requirements** – Each site you deal with will obviously be different, both in terms of the equipment used and the size of the network (with PoE mostly utilized within small to mid-sized networks). However,becoming familiar with the power requirements of specific types of PoEenabled devices, such as VoIP phones, will allow you to estimate the requirements of similar devices. PoE is advancing by the day, but it's still mostly restricted to low-power usage devices. Don't expect to be sticking Ethernet cables into any old machine in the hope of power-up. Additionally, understanding the standard amount of power required by devices will enable you to guess at the aggregate load on the switch or system.

3. **Document recurring problems** – Yes, between your own know-how, the advice provided here, and your handy network tester, you'll likely be able to solve individual problems in no time. But documenting recurring problems will also allow you better insight into the state of the network, and enable you to prevent the aggregating of smaller issues into one whopping issue (such as, for example, a network growing too large to support all PoE devices with the available hardware). Wherever possible, document patterns and report back to management, if for no other reason than avoiding replacing the same patch cable for the umpteenth time. If, however, this section has left you querying what on earth PoE is and why it's useful, **check out our PoE webcast**.

"a PoE connection isn't like that of a standard power adapter. It plugs, but it doesn't always play."

BONUS LIFE HACK – MULTIPLE USES FOR BINDER CLIPS

Ah the binder clip; the valiant nomad of the office environment. Binder clips follow no rules. Discarded and left to roam dusty shelves after their last noble purpose has expired, their general ubiquity in offices means that at any time, there'll be a binder clip on-hand to save the day.

1. **Fix reminders to server cages** – Use binder clips to stick key information and reminders to the walls of server cages, or have them stand upended with a sign post. We don't recommend scribbling passwords everywhere, but information pertaining to the idiosyncrasies of each server can prove useful.
2. **Smarten unruly cables** – A much more temporary solution than duct tape, binder clips can be used to fix groups of cables into place. They're also easily adjustable!
3. **Cable catching** – Easily one of the binder clip's best usages – stick one to the edge of a desk to catch cables from falling. No longer will you have to search for cables lost to a chaotic assembly of power adaptors.
4. **Organize the company fridge** – Best used with beer bottles, binder clips can be used to stack beer by fixing them onto the tray as side rails. Separate beverages based on their quality, awesomeness, or ownership.
5. **Money clip** – An age-old use of binder clips, use them to secure your wad of cash. Your tidy wad can be flashed at office love interests, or attached to a piece of string and dragged through the office in an endeavor to draw out avarice.
6. **Tea bag securer** – Sick and tired of plunging your finders into a hot cup of joe to retrieve your tea bag? No longer; use your binder clip to fix the tea bag to the edge of the cup.
7. **Broken foot keyboard repair** – Since time immemorial, keyboard feet have destined to detach, leaving us with a wobbly office tool. Binder clips are excellent improv keyboard feet; no more will your office be filled with the sounds of plastic clitter-clatter.
8. **Photo frames** – Binder clips can be attached to photographs, data sheets, network diagrams, wire frames, etc. for easy hanging.

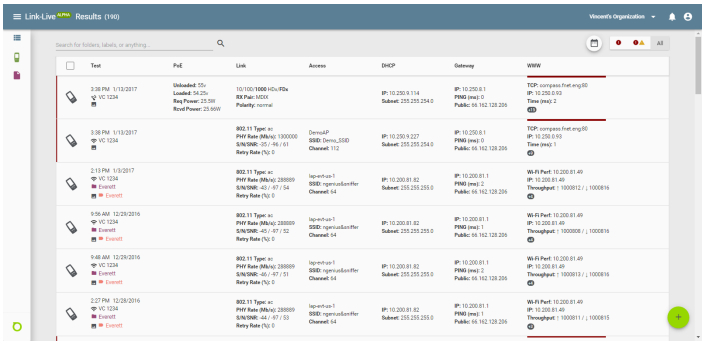
CATEGORY #3 – DOCUMENTING, REPORTING AND COLLABORATING

Creating an information funnel between frontline troubleshooting and the escalation path to the network engineer is essential to sustaining a healthy network and solving problems faster with better collaboration between teams. Unfortunately, while most organizations understand the need for documentation, it's often neglected or done once and forgotten. Good intention for best-practice maintenance is easy to formulate, but much harder to maintain. Without connectivity and performance documentation that can be easily shared between frontline and network engineering, Mean Time To Know (MTTK) can be a time consuming and frustrating task for all involved, particularly the end-user unable to get their job done.

1. CONNECTING WITH MANAGEMENT

Management shouldn't exist as an invisible layer looming overhead. Due to the sophistication of modern network troubleshooting tools, there's often a detachment between technicians and engineers. In the good old days, when the Internet still belonged to the cave dwellers, there was no automation, and everything within a network had to be manually reported.

1. **Use reporting automation to up your game and solve problems faster** – Take advantage of network testers that will automatically provide network connectivity information without time-consuming intervention required by you (i.e. going back to your desk, connecting the tester to your computer with a USB cable, and manually uploading results). That's too time consuming and will not be maintained, so make sure you have a way to automate this process.
2. **The proof is in the pudding** – Having a strong set of documented results will help the technician to validate and prove recurring patterns when issues are escalated to network engineering. Having "proof" will raise your value.
3. **Communication is a two-way street** – If you're onsite and have encountered a problem that isn't simply solved, being able to provide proof of the issue and problem domain to the network engineer will allow them to resolve the problem faster, and that's what the job is all about. Remember, you're the eyes and ears of a network engineer.
4. **Forgive their blindness** – Frustration is a common occurrence within the tech-engineer relationship. Management won't always know or be able to imagine the physical layout of a site or a network, and will therefore struggle to comprehend problems that relate to, for example, power and data degradation over long patch cables. It's not always a simple matter of replacement, and it's down to you to make sure the situation is understood and you can provide proof of findings as you collaborate with the network engineer to resolve an issue.



"Good intention for best-practice maintenance is easy to formulate, but much harder to maintain."

2. KNOW WHAT'S CONNECTED WHERE

If you're dealing with remote sites, you'll be dipping in and out of numerous networks on a weekly basis. The likes of PoE, as great as it is, has added to the existing complexity of modern networks, with many components, systems, and cables working in tandem and promising to conflict with one another at any moment. Understanding what's dependent on what will enable you to troubleshoot problems ahead of time.

1. **Map the connections** – Mapping connections may not be your problem. The task is often the concern of the network engineer and, more importantly, a side product of a technician's work. However, becoming intimate with the networks you frequent can pay dividends when problems are afoot, especially if you are providing managed services and would like to provide your customer with accurate documentation. Whether through personal notes or information fed back to a central database, taking the time to map connections and document connection paths in problem-frequented networks can help to streamline future troubleshooting, as well as avoid the possibility of power failures to PoE devices.
2. **Remember to refer back** – Validating how a device is connected can be a simple matter of using a network tool or examining the connection. However, it's also likely that you'll be able to depend upon the network's database to see past scenarios involving the corresponding devices, their connections, and the steps taken to troubleshoot.
3. **Keep apprised of problematic in-use components** – It's not always possible to replace hardware to solve network issues, no matter how tempting the option. There's always budgets, and you'll be faced by a 'good enough' attitude by management. However, for your own peace of mind, it's important to document what's connected to what – from the wall jack to the various network components – including switch port details (slot/port/VLAN). In this way, when the connection is working as expected, you'll know what 'good' looks like.

3. EXPERIENCE IS YOUR FRIEND

Experience is the foundation of effective troubleshooting. Even as a new technician, you'll be able to benefit from the accumulated experiences of technicians gone, automatically archived onto the network's database. PoE technology is tentatively evolving, but power fluctuations and instabilities can still be treated in the physical layer by examining what's worked and what hasn't on similar devices. **Even when your network tools fail to provide a full picture, they'll be adding to the mountain of experiences that enable you and your fellow technicians to treat each network issue effectively.**

1. **Network usage patterns** – Among the most valuable deposits of historical information are those relating to network usage patterns. Spikes in network usage can help you understand why a problem is occurring and assist in isolating the cause.
2. **Check the age of hardware** – Consult the network database to see when hardware was last replaced. While for a new site, it's safe to assume you'll be dealing with a fair amount of antiquated equipment, networks maintained for a long time should have a well-documented record of when individual components were replaced, and the reason thereof.

3. **Investigate fail history** – If you're presiding over the balancing of power distribution to PoE devices, it's worth checking for past instances of failure. It can't be overstated that many networks are increasingly power starved, exasperated by the growing dependency on PoE connections. However, like a game of Jenga®, added or removing pieces without first consulting the stability of the network or the provisioning of a switch will cause further issues later on.
4. **Recognize common issues** – While sometimes causes will originate from beyond the physical layer, which can be deduced via a network tool, oftentimes (and especially in small networks) similar issues will have common causes. For reduced connection speeds on isolated components, for example, it's likely that an older patch cable will be the culprit, or in cases of wireless, a router using an older standard.

BONUS LIFE HACK – MULTIPLE USES FOR LUBRICANT SPRAY

A can of lubricant spray's metallic shell glistens with the promise of endless possibilities – its limit only that of the imagination. Humbly advertised as a water and oil displacing spray, lubricant spray's inexhaustible applications have been well documented over the years.

1. **Remove labels and price tags** – Ever tried to slowly remove a label, only to have it tear midway? Use lubricant spray to remove aggravating sticky labels from new hardware or CD cases with ease.
2. **Removing resilient screws** – Anybody who has worked with screws will understand the pain of encountering the resilient last-screw-standing. Lubricant spray will sort out any obstinate screw, allowing for easy rotation regardless of rust or pressure.
3. **Lube up your patch cables** – If your patch cables need to fit through tiny, narrow gaps, a sprinkling of lubricant spray can be a great way of providing a little more flexibility and maneuverability, free from the friction of shield casing.
4. **Lubricate vinyl records to stop skipping** – If you're interested in the purity of sound and diligently collect vinyl records, you'll be happy to know that lubricant spray can be used to prevent dreaded skipping through lubrication of the vinyl surface.
5. **Make anything shiny** – Lubricant spray can be used to make pretty much anything a little shinier – including plastics and even plant leaves.
6. **Clean stainless steel** – Wipe down stainless steel surfaces with a helping of lubricant spray for a clean, preened surface.
7. **Getting rid of chewing gum** – Finding chewing gum on your clothes or hair is a horrid experience. Thankfully, lubricant spray is a sure-fire solution to removing nuisance gum.
8. **Degrease or clean a car** – Lubricant spray is great at cleaning grease away from motor engines, and even better at giving a shine to chrome.

"Network maintenance is a labyrinth of obstacles and new challenges; solve one problem and the next is soon afoot."

CONCLUSION

Network maintenance is a labyrinth of obstacles and new challenges; solve one problem and the next is soon afoot. Networks are always active – logging, expanding, and adapting – and a tech's job is never done. These lifehacks will give you the edge in maintaining an infrastructure that is primed for future challenges. With a robust set of tools, methods, and formulas, networks cease to be the complex monstrosities they appear to a beginner. Networks are misbehaving children, requiring pampering, a little direction, and a fair bit of problem diagnosis.

With each problem solved, you'll become better equipped to address the next. Between automatic troubleshooting and reporting and that which you'll do manually, you'll soon develop a comprehensive treasure trove of reference points to streamline future troubleshooting. In turn, this will enable you to trust your own abilities in the field – understanding what's immediately solvable and what isn't.

Remember: recover first, and then resolve. We all understand the pain of a failing network or loss of connection. Execute the formulas and best-practice methods to restore order. Blame can always be allocated later (it's the end-user's fault, or the ISPs, or divine intervention).

Enjoy these lifehacks; they're here to give you a foundation for troubleshooting, no matter the problem. Added network complexity will invariably rise, but awesome formula-based and method-tested approaches will forever remain an effective starting point. And remember, treat your network diagnosis tool as a revolver; it's there for when you need it, but diplomacy, whit, and investigative prowess can be equally as useful.

"Blame can always be allocated later (it's the end-user's fault, or the ISPs, or divine intervention)."

About NETSCOUT

NETSCOUT SYSTEMS, INC. (NASDAQ: NTCT) is a market leader in real-time service assurance and cybersecurity solutions for today's most demanding service provider, enterprise and government networks. NETSCOUT's Adaptive Service Intelligence (ASI) technology continuously monitors the service delivery environment to identify performance issues and provides insight into network-based security threats, helping teams to quickly resolve issues that can cause business disruptions or impact user experience. NETSCOUT delivers unmatched service visibility and protects the digital infrastructure that supports our connected world.

Solutions from NETSCOUT

AirCheck G2 Wireless Tester
Test and Validate Network Connectivity

The AirCheck G2 provides fast, simple, and accurate isolation and troubleshooting, thereby reducing the time to resolve wireless issues. AirCheck G2 simplifies wireless troubleshooting by providing:

- Support for the latest Wi-Fi technologies (802.11a/b/g/n/ac)
- A one-button AutoTest
- An instant view of test results including network availability, connectivity, utilization, security settings, rogue hunting, and interference detection
- Connectivity to a centralized test results management platform

More information at:
http://enterprise.netscout.com/aircheck

LinkSprinter Network Tester
Test and Validate Network Connectivity in less than 10 seconds

The LinkSprinter network tester provides network connectivity troubleshooting and identifies error problem domain in less than 10 seconds. Automated reporting to the included Link-Live Cloud Service ensures network connectivity status and path information is documented for every link.

The LinkSprinter gives you 5 essential network tests in the palm of your hand

- Power Over Ethernet (PoE) Tester
- Link to the Switch
- DHCP Connection
- Gateway Connection
- Internet Connection

More information at:
http://enterprise.netscout.com/linksprinter

LinkRunner AT Network Auto-Tester
Quick and complete copper and fiber network connectivity testing

The LinkRunner AT Network Auto-Tester performs 6 essential network connectivity tests in 10 seconds, enabling you to quickly and accurately identify and solve network connectivity problems. Cloud reporting automatically uploads network connectivity test results to the Link-Live Cloud Service for reporting and project management.

- Fast—3-second power on, 10-second AutoTest
- Verify connections at 10M/100M/1G on copper and fiber
- Cable testing and verification
- Nearest switch, port and VLAN informationn
- Supports PoE testing and IPv6
- Ping and TCP port connectivity tests to up to 10 user-selected targets
- Stores up to 50 test results

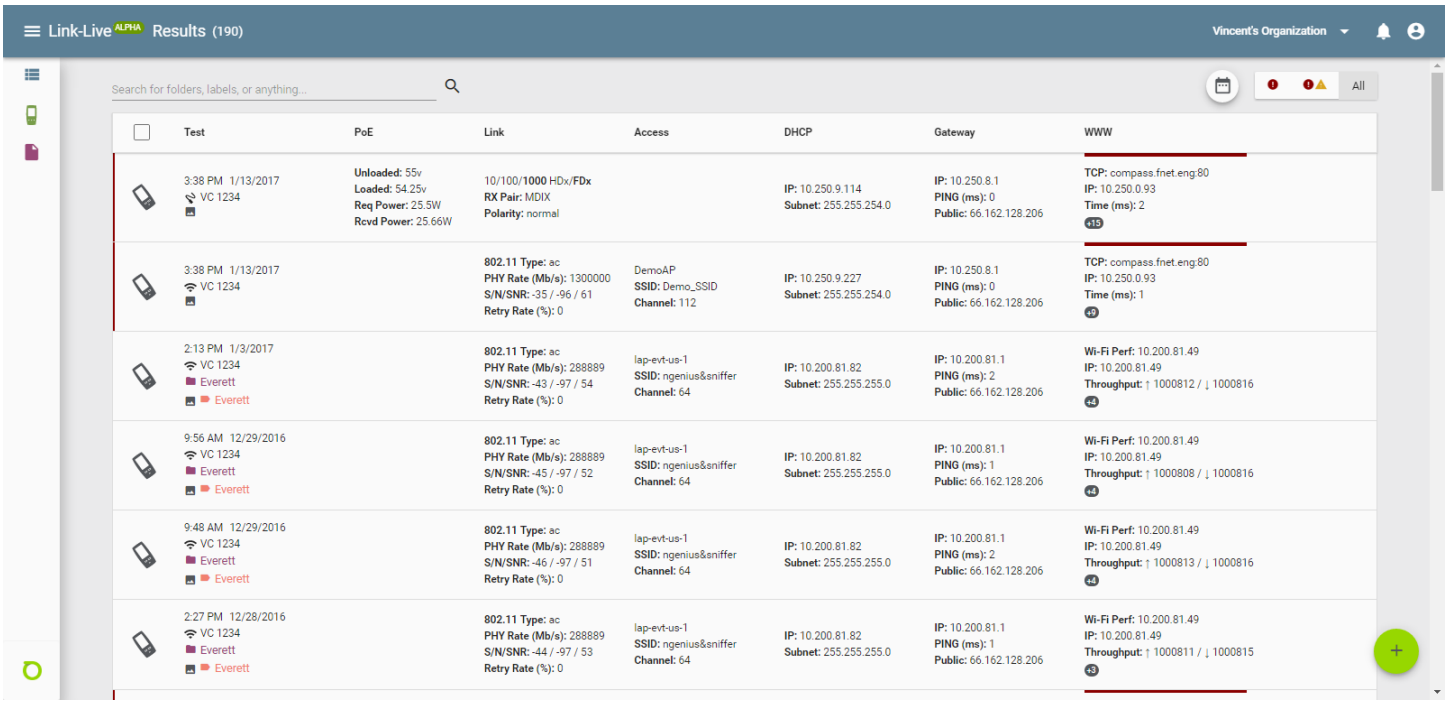
More information at:
http://enterprise.netscout.com/linkrunner

The OneTouch™ AT Network Assistant
Client to Cloud troubleshooting in 60 seconds

The OneTouch™ AT Network Assistant greatly reduces troubleshooting time through a streamlined, three-step approach:

- The unique AutoTest replaces multiple tools and an hour of troubleshooting time.
- A powerful set of network performance measurements to troubleshoot wired and Wi-Fi networks.
- It enhances team collaboration through a simple web-remote interface and easy-touse inline packet capture capabilities.n

More information at:
http://enterprise.netscout.com/onetouch



Link-Live Cloud Service, a centralized management, collaboration and archival workspace for network connectivity test results from NETSCOUT's hand-held network testers.

THERE IS NO OFF